

**REMARKS**

Claims 1-11 are all the claims pending in the application.

Claim 1 has been amended to include the limitations of claim 3. As a result, claim 3 has been canceled without prejudice or disclaimer. Therefore, claims 1-2 and 4-11 are pending in the application.

**Objection to the Title**

The Examiner has objected to the title as not being descriptive. Applicants have amended the title to “Optical Waveguide in the Interior of Silica Glass and method of forming Optical Waveguide.” Therefore, Applicants request that the Examiner withdrawn this objection.

**Prior Art Rejections**

The Examiner has rejected claims 1-11 under 35 U.S.C. § 102(b) as being anticipated by Miura et al. (U.S. Patent No. 6,154,593). Applicants traverse these rejections because Miura et al. fails to disclose or suggest all of the claim limitations. Specifically, Miura et al. fails to disclose or suggest at least the following limitations:

**Claim 1:**

A method of forming an optical waveguide in the interior of *a pure silica glass* comprising:

...

wherein *the pulse width of said femtosecond laser pulses is in a range of 210 to 420 fs.*

**Claim 4:**

wherein *an aspect ratio of the mode field diameter of said optical waveguide is controlled by changing the peak power of said femtosecond laser pulses at the focal point.*

Claim 6:

wherein both a mode field diameter and *an aspect ratio of the mode field diameter of said optical waveguide is controlled by changing* both the pulse width of said femtosecond laser pulses and *the peak power of said femtosecond laser pulses at the focal point.*

Claim 9:

*the pulse width of said femtosecond laser pulses is in a range of 210 to 420 fs.*

Claim 11:

a mode field diameter of said waveguide is in *a range of 10 to 14  $\mu\text{m}$ ;*

Miura et al. discloses an optical device that includes a glass in which a refractive index change region serving as a waveguide is formed in a continued state by laser beam irradiation. Col. 2, lines 6-9. Miura et al. discloses two examples and a modification of the second example.

Regarding amended claim 1, the Examiner asserts that Miura et al. discloses an example that creates a waveguide with a diameter of 12  $\mu\text{m}$  with a 120 fs pulse width. See example 2. However, example 2 is directed to a waveguide created in a *fluorate* glass, not the claimed *silica* glass. Therefore, example 2 cannot be used to support the Examiner's rejection of claim 1.

Regarding 4 and 6, the Examiner asserts that Miura et al. discloses an optical device that forms an optical waveguide in the interior of glass having high transparency (col. 2, lines 7), like silica glass. The Examiner also asserts that the diameter of the optical waveguide is controllable by the power of the pulsed laser beam at the focal point (col. 3, lines 66-68), which is controllable by the pulse width of the laser beam (col. 3, lines 19-20), and therefore, is controlled by varying either the power or pulse width or both as in claims 4 and 6.

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However, Miura et al., does not disclose or suggest controlling the aspect ratio of the mode field diameter by changing the peak power of the laser pulses at the focal point.

Regarding claims 2, 10/1-2 and 11/1-2, they should be allowable at least based on their dependence from claim 1 for the same reasons as claim 1.

Regarding claims 5, 10/4-5 and 11/4-5, they should be allowable at least based on their dependence from claim 4 for the same reasons as claim 4.

Regarding claims 7-9, 10/6-9 and 11/6-9, they should be allowable at least based on their dependence from claim 6 for the same reasons as claim 6. In addition, claim 11/4-9 should be allowable for the same reasons as claim 1.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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